

September 14, 1929

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AVIATION

The Oldest American Aeronautical Magazine



THE *N. A. A.*
CONVENTION

THE NEW *Hexhangar*

STARTING THE *All-European* LIGHT PLANE TOUR

AVIATION'S EYES are focused on St. Louis *The Crossroads of the Air*



EAST to west, north to south, sweeping diagonally from one corner of the country to another, the national aerial highways of the nation meet at the "Crossroads of the Air." Here, in the middle of the country, where transportation lines have always met—Aviation, too, has its focal center today.

Toward this vital-commercial crossing, Aviation's eyes are going now, to and around the national center most close the great developments of the industry. For, since Aviation is Transportation—fast, long distance, cross-country Transportation—its activity must be greatest where such transportation means the most, where the great air lines meet, and cross, and radiate.

So, to St. Louis, key city of aerial crossroads, have come one after another of the manufacturers, the transport companies and the service organizations—here to establish their headquarters. Here to St. Louis is coming the National Aircraft Exposition of 1939, the most important Aviation event of the year. Here, too, will come more and more of Aviation's business and manufacturing interests, in the locational advantages of Aviation's National Center become better known and understood.

Confirmed, accurate facts regarding Aviation opportunities in the St. Louis District, and a special survey, if desired, are available on application to THE INDUSTRIAL BUREAU of the INDUSTRIAL CLUB
211 Locust Street • St. Louis, Mo.

In St. Louis
1939 Gordon Bennett
Balloons Races
1936 National Aircraft
Show

THE WORLD'S
ENDURANCE RECORD
broken in St. Louis, by Jackson and
O'Brien, upon demonstration of superior
propulsion in short runs, which in
no manner or make (but the national
Center of Aviation).

"Midwestern W. A. A. A."
St. Louis, Mo. is the only
city in the world which is a
fourfold to make the 100 mile
St. Louis Circle within 100
miles of the city center.



The CROSSROADS OF THE AIR

These BUILDERS ARE DEMONSTRATING *Axelson* ENGINES

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Now the improved Axelson Axelson Engine is ready for inspection in the four planes—an engine with all the speed you want, controlled to reserve power. The four planes are being demonstrated with the Axelson. It represents tomorrow's standards—positive lubrication to every moving part, rigid construction, uniform valve clearance regardless of heat expansion—and many other features. A new booklet describing this improved engine is now ready for distribution. Ask for a copy.



Axelson Aircraft Engine Co.
Factory and General Office
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Finishes, fabrics and other du Pont aircraft materials offer unlimited opportunities for the originality now so necessary in airplane styling.



Flashing Bodies—Luxurious Interiors

TODAY aircraft makers place new responsibilities on the manufacturer. Commercial air transportation calls for added passenger comfort. Not only must your ships progress in mechanical design—but now, they must also consistently improve in luxury and styling.

To manufacturers of airplanes, du Pont offers a complete line of aircraft finishes developed to meet these present-day demands. Re-

sultful in texture, ultra-modern in tone and color, and specially formulated for air service—they bring you significant advantages in competitive selling.

Your whole finishing schedule can be based on these scientific du Pont materials. Wing dope, Primers, Aircraft Enamel, Army and Navy Finishing materials and many other products are available in their highest stage of modern development.

And du Pont color experts will gladly cooperate with you in planning up-to-the-minute color schemes. The du Pont Color Advisory Service is in constant touch with aircraft styling in both America and Europe. Feel free to call on them for any advice or assistance.

Complete information on any du Pont product for airplane use will be furnished either by mail or by a qualified representative.



E. I. DU PONT DE NEMOURS & CO., Inc.

Industrial Finishes Division, Paris, N. J.

1430 Elston Ave., Chicago, Ill.

312 California St., San Francisco, Cal.

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Distinctive houses, added comforts, now made possible by du Pont Pyralin and Fabrikoid—two materials uniquely suited to air service.

—Modern Styling that SELLS Aircraft

PRACTICAL refinements in cabin design and styling lend inestimable assistance in selling to the modern market. Gleaming windows, smart accessories, rich upholstery—color, life and comfort everywhere—are essential in the modern plane, just as in the modern motor car.

In the styling of modern planes, du Pont Pyralin and Fabrikoid offer almost unlimited possibilities. Extremely light, ideally de-

scribable, and beautiful in the most modern sense, these materials fulfill every requirement of air service.

Pyralin in various colors and effects provides transparent cabin windows, instrument boards and wing lights of smart appearance and utmost serviceability. Complete information and its many present uses will be furnished on request.

Fabrikoid completely modernizes cabin linings and upholstery.

In lightness and toughness make it highly practical for the air. And the design of the new Nemours Aircraftplane Fabrics express vividly the buoyancy and gusto appropriate to modern air transportation.

Du Pont technical men will gladly cooperate in applying these materials to style your plane. Please write direct to the division concerned.

AIR-TESTED MATERIALS

Du Pont Fabrikoid—Sturdy Fabrikoid is an ideal material for most cabin upholstery. It is lightweight, strong, resistant to wear, and easy to clean. It is available in many colors and textures. It is also available in a high-grade version known as **Fabrikoid**, which is used for the most exacting requirements.

Du Pont Pyralin—A strong, flexible, light, transparent, transparent material. It is used in any glass from a transparent to a transparent material. It is available in many colors and textures. It is also available in a high-grade version known as **Pyralin**, which is used for the most exacting requirements.



E. I. DU PONT DE NEMOURS & CO., Inc.

DU PONT VISCOLOID CO., Inc.

139 Fifth Avenue, New York City

FABRIKOID DIVISION

Newburgh, New York

C.W. "SPEED" HOLMAN

FIRST with NATURALINE



in the Gardner Cup Race May 31st

Flying a Laird, powered with a T-4 Wright Whirlwind motor and fueled with NATURALINE, "Speed" Holman flew the 468 miles to Indianapolis and return, in 2 hours, 58 minutes and 40 seconds—an average speed of 136 miles per hour.

"I opened the throttle wide," "Speed" said, "and kept her there all the way."

Mr. Holman, who is operating manager of the Northwest Airways, St. Paul, Minnesota, made a test with NATURALINE shortly before he entered the race and stated that it revved up his Hornet engine at least 60 R.P.M. And after the race he remarked that he believed NATURALINE was "the finest fuel available for aviation purposes at this time."

1st

NATURALINE



Fueling "Speed" Holman's Laird

Mr. E. Roy Alexander, Race Manager, wired us after the race as follows:

GARDNER TROPHY RACE TODAY STOP NINE SHIPS STARTED FIVE FUELED WITH NATURALINE WINNING FIRST SECOND THIRD AND FOURTH PLACE STOP FIFTH SHIP FUELED WITH NATURALINE DOWN DUE TO FANNIC BLOWN OFF FUSELAGE STOP GREAT VICTORY FOR WONDERFUL FUEL CONGRATULATIONS.



Product of
NATURALINE COMPANY OF AMERICA
Chester & Smith Building
TULSA, OKLA.



SYDNOR HALL

SECOND with NATURALINE



2nd

Sydnor Hall flew a Travelair, powered with a T-5 and fueled with NATURALINE. He dived onto the Parks airfield seventeen minutes after "Speed."

Mr. Hall also, was enthusiastic about NATURALINE. After the race in a letter to us he said, "I believe that this gasoline is the best gasoline made for aeroplanes at the present time. I particularly wish to emphasize the fact that NATURALINE is considerably lighter than the average and therefore should be especially adaptable for aeroplanes in which a minimum of weight is desirable."

Close upon Sydnor Hall's heels came Arthur J. Davis, flying a Waco powered with a T-5 Whitebird and fueled with NATURALINE.

NATURALINE

ART DAVIS

THIRD with NATURALINE



3rd

Then came John P. Wood two minutes later, in a Waco T-4, also fueled with NATURALINE.

A fifth place fueled with NATURALINE, was forced down because the fabric was torn from the fuselage, forty miles from the finish. This was Irvin T. O'Dell's Cessna. Mr. O'Dell was in second place when the accident happened.

Five out of nine planes were fueled with NATURALINE, four of which took the leading places.



Fueling Sydnor Hall's Travelair

Pictures show the fueling of the different planes with NATURALINE



Fueling Art Davis' Waco

PRATT & WHITNEY



"HORNET"
and
"WASP"

AERONAUTICAL ENGINES HAVE
SRB BALL BEARINGS

As Standard Equipment at Important Points

SRB Ball Bearings have contributed their unsurpassed ruggedness and reliability to every performance, altitude and speed record made by Pratt & Whitney "HORNET" and "WASP" Engines.

Such is the faith placed by Pratt & Whitney engineers in SRB Ball Bearings and the experience and reputation of the organization behind them. For the same reason, you will find the SRB product in other world-famous aviation engines including Wright, Curtiss, Warner, Le Rhond, Velle, and others.

STANDARD STEEL AND BEARINGS INCORPORATED
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Get these Profits from Protection



Landing fields clear for landing. Thoughtless children and curious grow-ups can be kept off landing fields by a sturdy barrier of Page Fence. No need for posts to risk 'crack up' to avoid pedestrians.



Planes and supplies protected



It is essential for safety that planes be accessible to only mechanics and pilots. You can have complete protection for your planes with Page Fence—ready pulling of supplies and materials.

One way IN or OUT—for EVERYONE



Page protection for aviation fields gives a definite check on both employees and the public. One way in or out pressure order—simplifies discipline—and gives a positive control on equipment and material.

—on the next page read about Page Fence Association plan service

Let the Page Fence Association Serve You in Planning Protection NOW!



Experts on protection give individual assistance



Now you are a member of the Page Fence Association—a group of fence experts ready to give you full advice—up to 48 years' Page experience and the 53 Service Organizations that form the Association. Anyone interested in better property protection will want the information available through the Association. Your name and address bring it. There is no obligation.

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1. Good material
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Trained erection crews assure lasting service

Local Organizations that depend on YOUR satisfaction

The Page Fence Association member who serves you has a business centered right in your locality. They know that you as a satisfied customer are the best advertisement they can have for their business.

This PROTECTION plan book is yours—no obligation

"Boundary Lines" is an interesting book full of valuable facts on boundary line protection. A copy is yours for the asking.

Write the Page Fence Association, 520 No. Michigan Avenue, Chicago, Illinois.



"Investigate!"

Get facts on Chain Link, Gabion and Coppersmith applications and other fence services.

PAGE CHAIN LINK FENCE

Gabion or Coppersmith Ornamental Wrought Iron

AVIATION
September 16, 1939

11

Vancouver to Mexico at 100 Miles an Hour!—Gas \$22.50



Tex is constructed by 1800 Mustangs chief of police

The landing at Agua Caliente



Tex as he finished his record-breaking flight

1350 miles in 13 hours and 7 minutes—in a stock model Great Lakes Sport Trainer—Tex Rankin at the controls—take off at Vancouver—south over the United States—landing in Agua Caliente, Mexico the same day—no stops—only 75 gallons of gas—that's Performance!

Exact counterparts of this marvelous ship are now being produced in volume—engineered to the highest quality standards.

The Great Lakes Sport Trainer is the outstanding value in the light airplane field. Write for new illustrated booklet and complete details.



The official check up

GREAT LAKES AIRCRAFT CORPORATION CLEVELAND





U. S.
1/2 Heavy Duty Drill
2000 R.P.M. Low Speed

\$44



U. S. 6" Bench Grinder
1400 R.P.M. Low Speed

\$34.50



U. S. 1/2 Special Drill
2000 R.P.M. Low Speed

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It's easy enough to copy—and copying is all right. But the real test of genuine mechanical ability is to originate, and to improve.

The same ability and experience, that conceived the world's first portable electric drill and electric grinder over thirty years ago, has been built into every tool in the U. S. line ever since. And today, even the same inventor is out in the U. S. shops experimenting, testing, improving—keeping U. S. "the standard of quality."

The U. S. line of portable electric drills, grinders, buffers, etc., is head and shoulders above all in its field. Whatever you need, FIRST try U. S. Then you can count on having the finest of its kind in your shop.

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or Write Us



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Export Sales Representatives—WESTINGHOUSE ELECTRIC INTERNATIONAL CO.—170 Broadway, New York City

Every Parks-Trained Transport Pilot is in a well-paying position today

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So serious is the shortage of Licensed Transport Pilots that every man trained for this work at Parks Air College is working right now and being paid big money for his skill.

The shortage of Transport Pilots is getting more acute. Factories are making planes and the public is buying them faster than pilots can be trained. Slow down sales and more so finding them selves stepping ahead automatically into positions paying as much as \$1,000 a year—more than the cost of the complete course—as soon as they receive their Transport Pilot credentials.

Nowhere can you get these creden-

tials any more quickly, or more certainly, than at Parks Air College, the biggest and best flying school in America, the school that got transport approval from the United States Department of Commerce without a cent's preparation for customers.

Parks-Trained Pilots Preferred Where Others Must Wait

So widespread is this school's reputation for high standards and absolute thoroughness of training methods that its graduates quickly discover that Parks-trained pilots are preferred.

Leaders in aviation, one of the richest of modern industries, know Parks Air College like a book. They know it to be

modern and complete in the most trifling details. They know of its staff of long-experienced pilot-instructors, none of whom has less than 1,000 hours in the air to his credit.

They know that all the school equipment, including the big fleet of open-cockpit and cabin ships, is new and kept up in the best of condition. They know that a man trained at Parks Air College has been TRAINED RIGHT, that he has had the best instruction possible, that he is a man with an assured future in the air.

6,188 New Ships Each Year With Only 4,160 Pilots to Fly Them

The Commerce Department has just announced that new planes are being licensed at the rate of 6,188 a year, new pilots at the rate of 4,160. That means there are only two-thirds as many new pilots as are needed to fly these ships. It means that each year there are 8,000 ships forced to stay on the ground because the highly paid, highly skilled men needed to take them up are lacking. That's opportunity for you!

Get into aviation! It's one of the most fascinating things on earth today. It's a handful of future for men of free spirit and, above all else, action. Action is the very backbone of this ever-growing work. Let your first action be the filing in and sealing of the coupon below. Now!



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Parks Air College has been rated by the Aeronautics Branch, Department of Commerce, as an Approved Transport Ground and Flying School.

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IN 1908
THE U. S.
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FIRST
MANUFACTURED PNEUMATIC
AIRPLANE TIRES
"TO HELP YOU FLY"

More than 30 years ago, when a 35 mile word was sufficient to keep the handiest pilots on the ground—when most planes were launched from special runways and, if lucky, landed on slabs of oak or oak.

It is when the United States Rubber Company demonstrated its first in flying by designing the first pneumatic tires for aircraft. The first tires to be offered were the so-called "Stanford Aviators"—produced by both Wingle and Curtis at the first American Aero Show in 1908.

Heavier tires soon followed and in 1914 there was published an advertising folder which was entitled "To Help you Fly" and which listed three sizes of airplane tires in addition to other flying accessories.

Today at all U. S. branches you will find a complete range of airplane tires in all standard sizes with



AN EXCERPT FROM THE ABOVE ADVERTISING FOLDER DESCRIBING THE ADVANTAGE "STANFORD AIRPLANE" TIRE

"Outlasting the heaviest use and weight of stumps in the new future we have designed that the tire should work."

either plain or man-made tread. Every one of these tires is of Web-Cord construction which gives the strongest and most durable structure that can be built. Web-Cord fabric, which only this company can offer, is a development of our own research laboratories—the largest and finest research laboratories in the world. And in line with the established U. S. policy, the facilities of these laboratories are at all times available to our customers for the working out of any aviation problem when rubber plays a part. A letter will bring a prompt response.

UNITED STATES RUBBER COMPANY



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UNITED STATES
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Reduce the Noise with **MICARTA Propellers**

THE din and roar of the propeller constitute one of the annoyances of aerial transportation. Propellers differ, however, and a remarkable difference is noticeable in ships equipped with Micarta propellers.

This quietness of Micarta blades is due, primarily, to the fibrous character of Micarta which results in absorption of the vibrations caused by torque and thrust irregularities—the common cause of flutter.

Micarta propellers are made of fabric treated with a synthetic bond and are molded to exact dimensions, with correct angle, track, width and thickness to obtain the highest efficiency. They are unaffected by atmospheric conditions, salt water spray, or oil. The pitch may be adjusted to suit flying conditions.

Write for detailed information on Micarta products for the aviation industry.

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EAST PITTSBURGH, PENNSYLVANIA
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1938

Aircraft Accessories

Micarta Propellers
Micarta Control wire Pulleys
Micarta Fasteners
Micarta Hinges
Micarta Bearing for Cable Releasing
Micarta Tail End Wheels

Aircraft Lighting Equipment

Chromite Landing Field Floodlights
Emergency Approach and Obstacle
Lights
Hazard Lights
Reduction
Transformers and Motor generators

For Happy Landings

By design of the aircraft and the perfect combination of the soundest principles of aerodynamics the Whittelsey Avian gives a flying performance that no other light plane can approach. Among points it is recognized as the standard plane for touring and sport. The pilot to fly, the owner to land.

In the air its mobility is remarkable. And added to the safety school in the design of the step-up Hoadley-Page wing plan which eliminates danger of spins and permits lower landing speed.

No plane is easier to land. And the glider-like undercarriage with its unusually wide track is steady, resilient and well-suited to close country touring where landings must often be made on rough fields.

Increase in a Whittelsey Avian. Its economy of operation will save you money. Its inherent stability and flying qualities will hurry the solo flight.

To Dealer and Distributor

When you fly or sell the Whittelsey Avian you have something to talk about. No other light plane has such a record of performance, or the equipment. National distributors of the Whittelsey Avian is being completed in the leading aviation centers of the country. Dealers and distributors are still being appointed. Write for further information concerning our sales plan. We will gladly send you the detailed story of the plane itself. The Whittelsey Manufacturing Company, Dept. A-5, Bridgeport, Conn.

REGISTER IT NOW!... First solo flight, England to Australia, 1938; first England to Australia, longest flight ever made in a light aircraft.



plane, 1938; first solo flight, England to India, first ever any flight, London to Rome.

SPECIFICATIONS: Power Plant, Cirrus Mark III 55 H.P. 4-cylinder, four cylinders in line aircraft engine. Top speed at 200 flying hours: 30 miles to gal. of gas, 100 miles to gal. of oil. Speed: Maximum, 165 m.p.h.; cruising, 85 m.p.h.; landing, 35 m.p.h.; Climb: 1700 ft. per minute; Ceiling, 5 hours at 450 miles; Range: 875 mi.; Endurance: 1450 mi.; Top, 1800 ft. Dimensions: Wingspan 28 ft.; Width folded, 5 ft. 0 in.; Height overall 2 ft. 6 in.; Length overall 26 ft. 6 in. Price: Only \$4995, New York to F. O. B., Bridgeport, Conn.

WHITTELSEY AVIAN



THE OUTSTANDING SPORT AND TRAINING PLANE OF THE WORLD

In the New Continental Engine

CERTAINLY every part in an airplane engine deserves to be called a "vital" part. But if there are some parts more than others that require the most exceptional care in manufacture, and material of the highest quality obtainable, these parts are the cylinder barrels.

The Continental Motors Corporation has selected Bethlehem Forgings made from Bethlehem "Airplane Quality" Steel for the cylinder barrels of the new Continental Aircraft Engine.

Bethlehem Steels and Forgings are extensively used by builders of aircraft and engines. Their contribution to the success of the Continental Aircraft Engine is amply fore-shadowed by the number of endurance records and other exploits, made by planes whose engines had cylinder barrels or other important parts made from Bethlehem Forgings and "Airplane Quality" Steels.



The new 7-cylinder Continental aircraft engine, with cylinder barrels made from Bethlehem "Airplane Quality" Steel.

BETHLEHEM STEEL COMPANY, General Offices: Bethlehem, Pa.
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FORGINGS



"AIRPLANE QUALITY" STEELS

THE AVIATOR'S GREATEST PROTECTOR

BYOND his own courage and skill, what serves as the aviator's greatest protector? The answer is dependable power... an engine that responds perfectly to every requirement, to every emergency in the air.

Such dependability is an integral part of Continental Red Seal Airplane Engines. This, together with lack of vibration due to proper proportion in design and balance embodies the best principles evolved during 28 years' specialized experience in designing gasoline motors, of which Continental Motors Corporation is the world's largest producer.

The result is confidence... confidence of the aircraft manufacturer who installs them... confidence of the aviator who rides the skies in a Continental-engined plane.

CONTINENTAL MOTORS CORPORATION

aeronautical division

Office and Factory: Detroit, Michigan, U.S.A.



Continental Engines

On Talking Facts

CONSPICUOUS among the papers presented at the recent joint technical meeting of the Society of Automotive Engineers and the Aeronautical Chamber of Commerce in Cleveland were three which indicate a trend of the times. Three authors quite independently undertook to make economic analyses of problems of airplane design and operation. Laying aside any pre-conceived prejudices or general impressions, they set out to find the answer by arithmetic.

The practice is a growing one, but it is not growing rapidly enough. Aviation has passed the emotional stage. What we need now is a campaign of fact-finding. Such matters as the choice of the speed at which an airline should operate; the price that can properly be paid for the saving of weight, either in the airplane structure or in the engine; the number of seats per gallon for fuel in order to reduce the consumption by a definite amount or to secure a definite increase in the power output of a given engine; those and many other topics of which they are typical, can finally be solved only with the aid of pencil and paper and slide rule or adding machine. The rule of judgment based on experience is obviously not to be despised. It is indispensable, but judgment must have some accurately known data to set as an anchor and a foundation for its exercise.

Those engaged in the aeronautical industry, as well as we who are in aeronautical publishing, are enthusiastic about the future of air transport. If we were not we should be in some other business. But enthusiasm is not a substitute for knowledge. To induce the indifferent section of the general public with our own enthusiasm and to inspire them with the desire to take to flying on their own account is very necessary. For our own sake, and in order that we may render the public the best possible service after they have been persuaded to think about taking advantage of it, it is equally important that we give analytical treatment to our problems. Enthusiasm is the driving power behind the aeronautical industry and its progress, but the result of a perfectly

calculated and balanced study of the facts and figures, laid when they will, is the steering gear. The more rapidly such studies multiply, and the more freely the industry as a whole exchanges the information derived from them, the less likely any of us are to waste energy by running off the track.

//

Country Business

FARM RELIEF is more closely allied with the development of aviation than many members of the aeronautical profession and most members of the political profession have realized. Farm relief is a phrase and a political issue. No over-night legislation will bring automatic prosperity to the agriculturist. Rather real prosperity, and advancement of farming as an industry, come through the combined application of more efficient production and marketing methods. That means the universal adoption of the most modern machinery and the airplane is probably the most modern of all machines.

Gasoline tractors and mechanical sowing, reaping, leveling and threshing machines have already revolutionized methods of agriculture. The equipment of the truck and automobile has greatly simplified marketing problems, making possible wider and more efficient distribution of many crops. The telephone, radio and automobile have drawn the isolated farm closer to our national life, and now the airplane will destroy the last barrier of isolation and bring city and country more close and constant contact. Aircraft are peerless instruments of the wider spaces. Men learn to rely for more rapid communication and mutual co-operation. The airplane will bring those benefits to even those daily activities demand that they live at greater distances apart.

One woman producer never now halts half-way directly to the market with which he does business. In one day he has made personal visits to and purchases

from ranches in the Imperial Valley of Southern California and the San Joaquin Valley of Northern California, situated hundreds of miles apart, accomplishing almost and giving personal supervision to work which would have required the attention of several men without the airplane.

Crop marketing is one phase of the airplane's possibilities. Others, such as crop dusting, seeding, crop inspection, and general transportation over a large range in series of machines has been recognized for some time. Further possibilities arise almost daily.

Whether the city dweller will leave the ground source in trade over scheduled inter-city air transport lines, it is to the country dweller that we must look for the immediate use of the small and specialized forms of aircraft. Prosperity for the builders of automobiles has long rested directly on the purchases of the farm population, and the same is likely to prove true for builders of airplanes. Those with their interests centered in a city have either the means for operation over the landscape to use small aircraft. Country folk here both and the intelligent recognition of this fact by the American aircraft industry will be a leading factor in ensuring the continued growth of the figures of airplane production and sales.

//

For the Common Welfare

THE AERONAUTICAL CHAMBER of Commerce has just been meeting in its several sessions at Cleveland. Its program of discussion was full of overflowing. Among the subjects on the docket were some that affect vitally every company in the industry, and every individual employee. It is deplorable that so little interest was displayed by a majority of those present in Cleveland. The apparent indifference of a large part of the industry to its collective interest is shocking.

When we find that less than one-third of the aeronautical airplane manufacturers belonging to the Chamber of Commerce are represented at a meeting called for the express purpose of discussing their problems, we can recognize two explanations. Some of those who ought to be present are having so much difficulty in keeping up with their own business that they have no possibility of finding time to consider anyone else's troubles or the industry's common problems. Others, among the smaller producers, are made feel that the big fellows will reach the decisions, and decide the collective policies anyway, and that it would be a waste of time for them to participate or even to attend the discussion.

Both groups are wrong. When a man is so busy with his own affairs that he has no time to consider his relations with the rest of his industry and the rest of the

world, trouble lies just over the horizon. There is something wrong with a manufacturing company that cannot find a way to have any one of its principal executives attend a meeting for the discussion of the Department of Commerce regulations under which next year's machines will have to be designed and built. There is something wrong with a manufacturer who does not care to get first-hand information upon a discussion of the standard discounts to be given on purchases of engines, or who does not take pains to have his own views ready for expression.

As for the notion that the small companies have no influence in such a meeting that they might as well stay away, if that be true it is their own fault. The good presentation of a good case counts for as much in a meeting of the aeronautical industry as anywhere else. The decisions finally reached by such gatherings are usually unanimous or nearly so, but agreement comes only as a result of free discussion and honest contact with one another. The discussion is broad and representative.

It was he that there was too much competing intrusions at Cleveland, but there was nothing that deserved precedence over the meetings of the Chamber of Commerce. The sessions were interesting and valuable but that will continue to be true in the future only if the industry makes it so. A large measure of the aircraft industry's future prosperity and of its claim upon the public's confidence will depend upon its demonstrated ability to co-operate. The meetings of the Chamber let the contact-stone of co-operation. The Chamber is entitled to more than lip service from its members. They owe what a member of them already are doing, giving a real participation in its work. Its meetings must be a genuine forum of the industry's views upon its problems. They must not be allowed to sink into stilted and speech arranged as-for-the-industry-through-of pre-arranged programs.

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Commercial Helium

AUGUST was the airship month. The Graf Zeppelin flew around the world, with an accompaniment of the Atlantic thrived in and with another about to be started as the month closed. The scheduled ship from Detroit, the fruit of seven years of study and effort, took the air. The two new British rigids are at last on the point of readiness for trial. The Los Angeles made the first public demonstration of the process of hooking a plane onto an airship in flight and casting loose again. At the Cleveland Airport perhaps for the first time in history—four "ships" intervened in formation. After years of doubt and previous pessimism the lay public is becoming enthusiastically airship-minded.

There will be no commercial operation of rigid airships no longer admits of challenge. We believe that capital will be forthcoming to support considerable operation of lighter-than-air craft. We believe very confidently that our nations are ready to paralyze them. Airships will be designed and built and made ready to be flown, but what are we going to fill them with?

In America that question admits of but one answer. The Zeppelin Company has used hydrogen successfully and with substantial safety for many years, but even the Zeppelins themselves are beginning to look with begging eyes upon a non-inflammable gas, and to consider the desirability of making some small sacrifice in lifting power to secure its great advantage in safety. Captain Lehmann, commanding the Graf Zeppelin on its most recent crossing of the Atlantic, has been quoted in the last two weeks as an advocate of helium inflation. Our own experiences with that gas has now been broad enough so that no other reasons any serious consideration. When to helium inflation we add the installation of Diesel engines, using a fuel not capable of taking fire in ordinary conditions and by any ordinary means, we shall finally achieve fire hazard from airship transport.

Helium it may be, but where shall it come from?

The most important field of helium-bearing gas, located in northwestern Texas, is under the control of the Bureau of Mines. The words of the Army and Navy are suggested, but the Bureau of Mines is hardly likely to go into the business of manufacturing helium for general commercial trade. The Bureau has not, to put it conservatively, given any enthusiastic assistance to commercial companies who are in the field of helium production. Their war could hardly have been made more difficult. If it were not for the Navy Department's awards of commercial contracts for the supply of helium at a time when the Bureau of Mines production was temporarily almost shut down, there would be no commercial industry today, and the Los Angeles would have had to be laid up for a considerable period.

Three years ago, when there was no commercial helium production, it was being generally assumed in Washington that the Government would ultimately withdraw from the business, confining its attention to a continuation of the research work which had already proved so valuable and to the exploration of new fields, and leave private production to those who would make it a business. Now the beginning of an industry exists, and it is getting very alive and vigorous.

The position of three years ago was right. Any attempt open or covert, direct or indirect, to maintain a Government monopoly in helium production is wrong.

As a matter of general policy, the Government ought not to be in the business of manufacturing any commodity. Helium should be no exception. The situation of gas and of companies to enter the industry, so that they may not be unfairly outbid several producers, with the purchaser's interest protected in the usual

fashion by competition should become a fundamental of our policy. There is nothing more important as a preliminary to putting the airship to work commercially. As a definite step for the immediate future, the War and Navy Departments should make it a rule, even at some temporary sacrifice in cost, to fill at half their before demands in the commercial market when gas is available on reasonable terms. To say nothing of the benefit to commercial operations to come, in the long run that will be good government economy.

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The New Mexico Tragedy

IT IS TOO EARLY to make any technical comments of value on the crash on the slopes of Mount Taylor which cost eight lives last week. That must await the official inquiry, and the references of further evidence bearing upon first causes. Explanations of sympathy, however, are never precious in such a case, nor are some general observations about the attitude that we should take in the face of misfortune.

Safety has been a great problem—more greatly—from the very first days of organized industry and organized transportation. Safety is to be increased, in the air as on sea, or in the factory only by persistent analysis of the causes both of actual accidents and of theoretically possible accidents, and then by eliminating those causes one by one. For example the danger of fire in the air or upon water has not been entirely eliminated, but it has been reduced to a minute fraction of what it was ten years ago as a result of the patient experiment and study carried on during that period by the Army, Air Corps at Wright Field and by a British committee on fire hazards. The essential is, then, that no accident should pass uninvestigated and that we should extract the last bit of information from each one in order that there may be no recurrence.

When sensational accidents happen the popular reaction often borders on panic. This is the time for us to remain ourselves, and to remind the non-aeronautical public so far as we can that safety is concerned with accidents over a reasonably long term. An accident is no less safe this week than it was last month. Rather the reverse. It is still true that the hazards of travel on well-managed air lines are, and have been, shown by experience to be small. No effort will be spared to make them smaller.

To the relatives and friends of the crew and passengers of the City of San Francisco and to the officials of Transcontinental Air Transport, to whom safety has been the object of constant thought and care, it would be imperative to speak of consolation. We can only, and we do offer our very profound sympathy to all concerned.

ONE AND ONE-HALF ACRES of Hangar Floor Space UNDER ONE ROOF

By CHARLES F. McREYNOLDS

REVOLUTIONARY in design and of unusual size, the all-steel and concrete hangar-shaped *Hexahanger* recently erected on the new Los Angeles terminal field of Western Air Express, Inc., marks the first big step in a definite trend toward the development of airport buildings designed to meet the complex needs of air line operations. Until thus far developed, their "boxed houses," invariably litter their flooring dry docks, and bus operators their special service pits for overhaul and servicing of equipment, but up to the time that the "Hexahanger" was conceived and built by the William Farnes Company, most air lines had been content with large rectangular structures not far removed from the barns and sheds which cradled much of aviation's early development.

Containing 34,000 sq. ft., or an acre and a half of floor space under one roof, the Western Air Express *Hexahanger* was designed to simultaneously service six of the 32-passenger, four-engine DC series bombers soon to be placed in operation. This giant building is 286 ft. in diameter, and has six exits, each measuring 143 ft. with an unobstructed door opening 120 ft. by 20 ft. high. Each of the six sections of the building is an equilateral triangle 143 ft. on a side, and the entire building will house either six DC-74s, or six F-100 fighters, or six Boeing or Douglas jet planes all at one time and if necessary many small planes can be stored in the hangar along with the six DC-74s.

Some conception of the size of this hangar is given by the statement that there are 275 tons of structural steel more than 52 tons of corrugated iron sheathing, and

1,300 yd. of concrete used in its construction, the total cost of the building being \$94,000 or \$1.00 per sq. ft. of floor area. Not one stick of wood is used in the structure anywhere.

When Western Air Express, Inc., recently decided to abandon Van Field and construct its entirely new terminal on a site near Alhambra, C. C. Cole, superintendent of operations for all Western Air Express lines suggested that a special service hangar be developed for the new field. William Farnes, president of the William Farnes Construction Company and a leading Southern California contractor, conceived the idea of grouping the planes to be served about a central control point. Following this idea the design for the *Hexahanger* building was developed by A. M. Edelman and A. C. Zimmerman, associated archi-



"Hexahanger" erected at the Los Angeles terminal field for Western Air Express by William Farnes Company.

tects and the engineer for this hangar and the complete development of the field was awarded to the William Farnes Company. This company has now applied for basic patents on the *Hexahanger* and is specializing on airport design and airport building construction. Wide interest has been aroused in the new type hangar, both in this country and abroad, and more buildings of this type will probably be erected on other airports under development.



Exterior view of the completed hangar showing six doors open on all sides.

In developing this hangar it was considered that the proper shape for a unit within which but one plane is to be housed is a triangle, because of the proportions which are common to all airplanes. At least for servicing it seemed desirable to group these triangular units about a central point in order to simplify handling of supplies and the direction of working personnel. Eight exits, or a hangar of octagon shape, were first considered, but it was found that much space would be wasted in the octagon type because the section sides would be longer than the door openings, whereas all conventional planes have a greater wing span than fuselage length. A pentagon, or five-sided figure seemed ideal from the standpoint of area per plane housed, but this shape was discarded in favor of the hexagon because of the symmetry of a hexagon which makes it cheaper to build, easier to brace, able to handle one more plane with little sacrifice in added building cost, and too, because the hex building is easier to place and better looking.

Because of the interlocking structure resulting from supporting a symmetrical hexagon shaped roof it is possible to use considerably lighter steel throughout than in

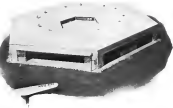
the conventional type building and at the same time a more unobstructed floor is obtained with roof girders of shorter span, the longest span girder in the *Hexahanger* being 82 ft. This type of structure is naturally well suited, particularly against violent winds and the shape of the building reduces wind hazard factors, there are no sharp corners or large blank walls to catch the wind.

Each of the six sides of the *Hexahanger* is chiefly composed by a 120 ft. door opening, which is fitted with Prestress structural hangar doors on ten 35-ft. units and two 15-ft. units, rolling each way to a blank wall so as to permit all doors to be open at the same time without interfering with each other. Two of the units have small pilot doors in them for the use of persons entering or leaving the hangar when all doors are closed. Although the doors may be quickly

hauled by attendants, electrical equipment is being installed which will make possible the throwing open of all six doors simultaneously by operating one switch on the central control panel. Approximately two-thirds of each door is devoted to window glass, there being a total of 6,300 panels of 36-in. obscure green glass in the entire building; 4,000 panels in the doors alone and a total window space of 44,676 sq. ft. All door units are equipped with rubber weather strips to completely seal the hangar against weather with the doors closed.

THE CONCRETE FLOOR of the hangar has a slope of 15 in. from center to circumference, raising a possible for one man to roll the largest plane out of the hangar by gravity is an easement. All covering on roof and sides is with copper lining galvanized corrugated iron sheathing. The roof is so constructed that 60 per cent of all water falling on it drains to the center and flows to an outlet beneath the hangar floor.

Construction of all walls, sections, storage, etc., is the chief feature of the hangar. In keeping with this idea there is a hexagon shaped building at the center, 40 ft.



in diameter, one-third of which is occupied by lanterns and ladder rooms, and two-thirds by a stock room. Above this stock room building is a mezzanine floor reached by a circular staircase, on which is located the office of the building and an observation platform running completely around this office for the use of the shop superintendent in supervising service operations. In this control building an electric panel is located which controls all lights or electric motors in the building. Installation of plumbing fixtures and electrical equipment is greatly simplified by the manner in which all pipes and conduits are extended from one point. In each of the six sections of the hangar there is a small service pit containing air, water, and electric power outlets, gas, water, air, and electric outlets are also provided from each of the six main control pillars which are located 20 ft. out from the central building.

One of the chief features of the hangar roof is an 8-ft. deep center 80 ft. in diameter which provides vertical views all the way around the center of the hangar above the 20 ft. level, thus flooding the interior of the building with indirect light. Skylights are also installed above each work bench and above the central office. The vertical control windows are of vaulting type and in addition there are twelve 24-in. Rothenstein ventilators located in the roof as protection against gas fumes. Six red obstruction lights are mounted along the outside diameter of the hangar roof and six beacon lights are mounted, one on each point of the roof. In addition there are six floodlights on the ground which light the building at night to render it more clearly visible from the air. As a

further aid to visibility the entire hangar, roof, doors and walls, is being painted with 15-ft. orange and black squares.

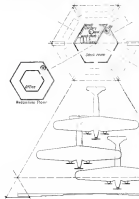
Outside painting is by IBM-Halsell's Miconoline cement paint, which is waterproof and impervious to the weather. The entire hangar interior is heavily sprayed with aluminum paint for weather protection and better lighting.

Complete fire fighting equipment is installed on an exterior pressure tank being connected to a number of outlets within the building, in any of which a hose may be attached for reaching the fire area.

During construction of a storage hangar the Western Air Express is using the Hedschaug for both storage and service. Just as soon as possible, however, it will be cleared of everything but service equipment. The plan calls for every Western Air Express plane to go through the service hangar into storage after each run. The storage hangar is of triangle cut construction consisting of six units, suggested to give a working of parallelogram form with three planes occupying stalls on each side of the building.

Many economies in servicing result from the use of a gas hangar. Most important is that the superintendent is close to all work being done, and can supervise all operations without leaving his second story office.

Next in importance is the fact that all supplies and tools are equivalent from all work each man having a minimum distance to walk for the needed tool, where in the ordinary type hangar he might walk three times as far, which when repeated many times daily adds greatly to labor cost. Another important item is that the work room is close at hand and the minimum of time is lost in waiting it. All work benches are concentrated around the central building and it is apparent that where one workman must help another or ask advice, he can easily do so without anyone must leave. Another factor is that servicing such as on batteries, magnets, wiring, etc., can each be concentrated in a separate bench to advantage and men from each plane may be brought to that special bench or workman. It is also possible to specialize em-



Above: Stock room in the center of the hangar. Left: Ground view with perspective showing accommodation for three transport planes in each section.



Above: Interior view showing the method of telescoping doors, and the large amount of electric space in store above closed doors. Below: Interior view showing parking of planes in one section of the hangar.



tion service operations in certain segments of the hangar as for instance in the present hangar one section is equipped with an overhead walkway and water outlet which permits a worker with the engine support portion of the plane's wing by using the long handled water brush operated from along the walkway.

Although convenient in conducting service operations only is one hangar and in having a separate building for engine overhaul or wing and landing gear is found in the fact that the service building can be equipped with many special stands used in servicing which would be the way for any other operation. Also more complete structural service requires very special tools which are best kept in a separate shop. In the near future a separate wing and engine repair shop building will be erected adjoining the present service hangar.

The Hedschaug shaped service hangar provides just the right set of old corners for placing of benches, and

sockets, where they will not be in the way as is often the case with the rectangular hangar.

The shape and arrangement of the hedschaug permit traffic to flow planes into the hangar and then so proceed to exit by means of a center alleyway without difficulty. The approximately circular shape also permits placing the hangar in odd corners of landing fields, which are always present when cross runways are laid out on rectangular fields. In fact from the serving angle there seem to be so many advantages to the hexagon or circular type of hangar that this form of building is sure to be very carefully studied by air line officials.

For installation on a private or fixed commercial field there is much in favor of the Hedschaug also. By partitioning off each segment of the hangar it is possible to rent at least in cheaply per plane as space can be rented in any other hangar, give the advantages to the private owner of having a centrally located wash room and a central parts and supply room, perhaps operated by a separate company which would efficiently supply all hangar necessities. From the storage standpoint the outstanding characteristic of the Hedschaug is the accessibility which it provides, making it possible to move any plane without moving any other, something that is impossible in the conventional type hangar.

Considering all of the advantages made available by the hexagon type of construction a comparison of costs is against less permanent types is of unusual interest. The officials of the William Eason Construction Company do not believe it is possible to erect the ordinary first-class hangar of wood construction for much under \$5.00 per square foot of hangar floor area according to figures recently published, while the Hedschaug built for the Western Air Express, with complete equipment and the finest construction and finish that could be desired, was erected at a cost of \$1.60 per square foot. Figuring depreciation over a period of years, they consider that such and concrete construction must be granted to be the cheapest, to say nothing of lowered fire hazard and increased efficiency of the building.

STARTING THE *All-European*

By EARL D. OSBORN

LIGHT PLANE TOUR



OFFICIALS who think that there are difficulties in connection with making the Rand Reliability Tour will appreciate the amount of organization necessary to run the Challenge International de Tourisme. The tour, which this year was conducted by the Aero Club of France, started from Orly, near Paris, carried the contestants on a 3,900-mi. trip through twelve different countries, each with its own customs and language. Originally there were 88 applicants for entry from ten different countries. Any tour is difficult to manage, but under such circumstances the effort is little short of stupendous.

This international light plane tour is very direct evidence of the increasing importance which Europe is placing on the development of the light plane. Last year no country except England had adequate light planes, and the tour itself did not go outside of France. Also there were entry fee contests. However, it is being more and more realized by the various countries, that the cheapest and most practical way of having a reserve of military force is to encourage the development of private flying. The fact that these planes, which are the result of government encouragement for military purposes rather than of commercial demand, should be competing in more or less friendly rivalry, brings out clearly the international character of aviation.

The actual number of planes which showed up at Orly before the dead line at noon on Aug. 3 was 55, representing eight different countries. The largest representation was that of Germany with 8 B.F.W.'s, 6 Klemens, 3 Jodels, 2 Rado-hatterstrains, 2 Allatians, 1 Anala, 1 Duff (Dienstadt-Altkreisliche Flugzeugwerke), and 1 Podo-Wall, making a total of 24 planes. Italy had twelve, including: 4 Futs, 4 Officiers Perovronne Mendiville (Romeo), 3 Brosas, 1 Carriere Noelle Trieste. France had nine: 5 Poles, 3 Carriers 1

There: A group of Italian Brosas about to start the race.
Below: Capt. Oswald ready to take off in his single ship.



Giesches. Also entered under the auspices of the Aero Club of France were 2 St. Roberts (Belgian), 2 Moths (British), 1 Baron-Miedlerich (Jago-Sier), Czechoslovakia had 2 Anas and 1 Aero, while Switzerland had 2 Klemens. The United States was represented by a few unofficial observers.

Entries were made through the Aero Club of the various countries and practically all the planes partic-

ipating were sponsored by their manufacturers. All the entrants were required to carry two people. There were two classes, one for planes weighing up to 416 lb. empty, and one for those weighing up to 860 lb. empty. The winning of the contest was based on a formula in which speed in aerial flight was the most important. The maximum number of points which could be gained by any contestant was 165, divided as follows: practical qualities of the plane, 45 points; endurance, 25 points; regularity, 35 points; speed, 20 points. No points were given for quickness of take-off or landing and as a result several of the German machines were really special racing planes.

The points granted for the practical qualities were divided as follows: strength of construction, 10 points; and landing gear, 8 points; self starter, 3 points; dual control, 3 points; parachute, 2 points; fire extinguishers, 6 points; landing wings, 5 points; for reliability (various parts of the engine and plane being tested), 30 points not clearing propeller, 5 points; not changing a wheel 1 point; total, 40 points. These points to be assigned by a committee of judges representing the various aero clubs.

Early to give the tour more of the aspect of a race and partly because it would have been impossible to handle all of the planes on some of the smaller aerodromes at one time, contestants were allowed to cover more than one stage a day. There were 25 compulsory stops, but others were allowed without prearrangement, except that speed was figured on elapsed time between listed stops only. The controls were open from seven in the morn-

The tour of Europe, of which the opening stages are described by Mr. Osborn, continued successfully to its close with thirty-two machines among the forty-three starters reaching the finish. It represents a phase in an energetic effort to promote the idea of private use of light air planes for touring in Europe. Both in the plan of the tour and in the design practices shown in the machines entered there was much to interest the American industry.

ing until eight at night, and to give the full 35 points for regularity contestants had to cover at least one lap each day. The maximum time for completing the course was eight days, and the maximum was fourteen. The average length of the legs was about 160 miles, the longest being 300 miles and the shortest 75 miles. Due to passport and custom difficulties, it was expected that there would be considerable delays when going from one country to another. There were also persistent rumors that certain countries would not allow flies from certain other countries to land at all. In any event, there were four military routes in the direct course, over which the flies were not supposed to pass. Charges that some of the pilots ignored this stipulation led to some dispute over the awarding of the prizes after the tour—2d J.

The handling of the planes at Orly was excellent. The machines were housed in the aerodrome hangars, which are excellent concrete buildings over 600 ft. long, 150 ft. high and 300 ft. wide. The 50 competing planes only occupied about one-third of one of the hangars. The planes of the various nations were grouped together, and each type was given a letter in addition to its number, so that they were easy to identify. The pressure of weightmen judging the practical qualities and the consumption tests were carried on with a stopwatch which



Concrete hangars at Orly where the planes were housed before the race.

with a great credit to the organization of the French Aero Club.

There were twenty different types of planes which arrived in time for the opening of the event. All but one were two-seaters; a type which is only beginning to receive serious attention in this country, and only a few notable exceptions such as the Blohm and the Klemm, they were more or less experimental machines. By this is meant that many of them had only been recently completed and that they had not been proved over a series of years in practical operational questions. The Europeans are accustomed to very small low-powered cars and it may be that there will be a market abroad for the smaller of the two classes of planes listed in the text, but it is hardly likely that they would fill a popular demand in America. A plane weighing only 600 lb. is a pretty small affair and many of these planes were not rugged enough to seat comfortably a full-sized passenger. The power plants in these smaller planes ranged from 40 to 80 h.p., and with the latter a 100-h.p. plane should have plenty of reserve.

There were very decided national characteristics in the planes. Almost all of the German planes were low-wing monoplanes; the Italian were all high-wing monoplanes; the only one British design were biplanes; while the French had examples of both. The German airplanes are well known in this country, as they are built by the



Blohm-Messerschmitt 46, with 30 hp. Cirrus engine

Aeromarine Plane and Motor Company. The R.F.W. is very similar, except that the wing is slightly more upturned and smaller. The three all-metal Junkers were structurally the most interesting and pleasing machines at the meet, but the machines was too small for comfort and too wing was rather thin and of small area, so that the take-off did not seem to be satisfactory. Also the landing gear of one of these collapsed while taxiing across the field. The other German planes were built by small firms or groups and were thoroughly experimental in their design. They showed, through the influence that gliding has had on German design, and were most pleasing to look at. One of the most interesting was that of the Akademie Fliegergruppe D-18. It was a true cantilever biplane with so much stagger that the leading edge of the lower wing was to the rear of the trailing edge of the upper wing. This unsymmetrical gear caused best visibility, and apparently the plane had a good take-off and low fuel consumption combined with considerable speed.

The French Potez D-1700-center remaining one of an

enlarged Monospace, rather crudely built, but comfortable to sit in and selling for \$3,000. The Caudron, after having built a high-wing monoplane for several years, is now building a low-wing machine which, though not especially pleasing to look at, gives the appearance of being substantial. The Gerdau was very reminiscent of a Cessna but built entirely of plywood. All the French machines were new types and looked neither crude and experimental.

The Italian machines were those which had been developed in Italian light plane competition. They were all of the high-wing cantilever-braced type, and looked like general machines. The Fiat for which an order for 300 has been placed by the Italian government, seemed rugged and well built, though the design gave the impression of being a little old-fashioned. The wing bracing extended over the pilot's head, allowing the fuselage to be cut away for ease of entrance to the seats.

When all is said and done, however, the two classes of the machines at the meet and exactly they have the advantage of having proved their practical value and having already gone through their torturing trials. It will be interesting to see the final results of the meet, and it will be surprising if these machines do not show up well. (Mr. Osborn's manuscript was of course prepared and forwarded just as the meet was starting. One of the Blohm planes by Captain Bredt, actually made the fastest time around the circuit. Results of the tour will be found in the foreign news section.—E.H.)

In construction most of the machines were built of plywood with wooden wings. Some of them were fitted with slots or with landing. Rather cords or disks were more common than slots in the landing gear. All the engines were air-cooled, and the majority of them were radial. Most of the planes were fitted with spooling tubes, but only a few of them with propellers.

The financing of the tour was done in large part through the entrance fees paid by the various entering new clubs. The first prize was about \$4,000, the second \$3,000, the third about \$1,000 and there were seventeen prizes of about \$500. Besides the various prizes, along the route are going, special prizes and medals of the manufacturers of planes and engines are giving special prizes of their products into prizes.

Out of the 59 planes which arrived in time to enter, only 43 actually started. Some of the entrants were overweight, some failed in the gasoline consumption trials, and several were of such an experimental nature or had been so recently completed that minor or major troubles occurred. One German machine collapsed in the air while starting, the pilot being killed. Another on landing when the pilot did not recover from a side-slip, and one collapsed as landing gear while taxiing.

For the entrants tests and for the actual start of the race the planes were lined up and then started in batches of three or four at a time. Many of the planes especially in the lower weight class, seemed underpowered. On the whole, the biplanes seemed to get off and climb better than the monoplanes. Several of the monoplanes took long runs and did not start until they had flown for half or three-quarters of a mile. It was obvious that many of the designers had built planes which though efficient were not suitable for the amateur flier who needs ample reserve power. It is most unfortunate that there were no American entrants, as the tour is a real test both of the planes and the pilot.

THE N. A. A. CONVENES

The National Aeronautical Association, in the Annual Settlement of its Affairs, Re-elects Senator Bingham

THE National Aeronautical Association held its eighth annual convention at Cleveland on Thursday, Friday and Saturday of the week of the 15th. The convention of which the last session was actually attended by about one hundred fully certified delegates, was presided over by Senator Bingham. Approval of the work done by the present administration and a vote for the assurance of the continuance of its policies, which the chairman of the committee, committee appeared in submitting his report, appeared to be generally shared by the delegates.

The nominating committee, presided over by Dr. George W. Lewis of Washington, brought in the name of Senator Hiram Bingham of Connecticut as the only nominee for the presidency. Their being no other nominees from the floor, Senator Bingham was unanimously elected. The present vice-president, Roscoe Vaughan of Wichita, was also chosen for another term.

Col. B. F. Clarke, chosen to preside over the association at its first convention and veteran of seven years in that office, had made known to the nominating committee that his new individual responsibilities would make it questionable for him longer to devote attention to the work. To succeed him the committee proposed John F. Vanecko of Washington, assistant secretary of the National Advisory Committee for Aeronautics, as the presiding officer over the present convention and various sessions of its predecessors. For secretary, G. E. McDuffie of California was nominated. In every case the committee's nominees were unanimously approved.

As governors at large, three of the present board were nominated together with two new members. To the news of Orville Wright, Godfrey L. Laing and Porter H. Adams there were added those of William F. MacCubbin Jr. and Benjamin F. Castle. Mr. Rankin nominated from the floor Mr. Thurston to provide a representative in the group for the Pacific Coast. Secretary MacCubbin offered to withdraw his name in order that the Pacific Coast might be represented by Mr. Rankin rather than consideration be directed to withdraw his name rather than give his selection a place of origin of the five men already named. In doing so he expressed an earnest hope that the nominating committee would provide for representation of the Coast territory in the future.

The work of the national nominating committee concluded, governors for the various states were nominated from the floor by the chairman of state delegations. In most instances the present state governors were re-elected.

In a brief speech of acceptance and appreciation of the action of the convention Senator Bingham expressed his determination to give to the association all of the



Senator Hiram Bingham is elected president of the N. A. A. Col. B. F. Clarke is nearly general manager.

time that his noble share permitted, and regretted that it had been difficult for him to find the opportunity of making the changes as he would have desired to do during the past year.

Senator Bingham had spoken at considerably greater length on the opening day of the convention, reporting on the Association's work during the past year. A lengthy address was delivered by Col. Paul Henderson, who dealt especially with the necessity of keeping the industry on a firm foundation and steering a safe course between dangerous overextension and undue conservatism or pessimism.

The resolutions committee, as on several past occasions, was headed by Godfrey L. Laing of Boston, past president of the Association, and brought in a total of twenty general resolutions in its two reports.

THE SPECIFIC APPROPRIATE TO THE WORK OF N. A. A. They recommended, among other things, that a new and comprehensive plan should be evolved for securing the national means to provide for adequate compensation to the N. A. A. for its services and for its proper identification with the nation and their conduct a special committee of three to be appointed to study the matter. Another resolution requested that the contest committee draw up a clear and complete statement of the conditions governing the issuance of certificates in general, and another directed that the committee give study to the subject of performance claims for aircraft by interested parties and to the possible desirability of providing means of checking or substantiating them.

In the more general field the resolutions called for the construction by the Federal government of a model airport at Washington for a more liberal support by

Congress of the five-year program of the Army and Navy, which were declared to be manned with failure by inadequate appropriations, and commended the three aviation structures at War, Navy and Commerce both for their work in their own departments and especially for their cooperation. The resolution pledged the Association's support to their efforts.

Another resolution conveyed the felicitations of the Association to Dr. Kelenner, and urged upon the Navy Department the importance of supporting an American airship program. Another commended the good wishes of the association to Mr. Porter Adams, the president in 1937 and 1938, and expressed regret over his unfortunate inability to attend. Mr. Adams had been present at every previous convention since the inaugural one at Detroit seven years ago. The Association took formal action approving the participation of the Federal Government in the International meeting called in Paris by the International Commission for air navigation three months ago and urged that the State Department should use all proper methods to promote such participation in the International Convention as would make it acceptable for ratification by the United States. Another resolution bore upon the same topic, with special reference to the importance of American participation in the making of international rules for the direction of air traffic, for the solution of the international air routes. Most of the resolutions were approved by the convention without material change. One which concerned much discussion, and which was finally laid upon the table with a decision to the board of governors to study the subject and draft a substitute, was very long. It expressed gratification at the improvement in aircraft performance and especially in their commercial use, applauded the actions by federal and municipal governments that had made the advances possible, and specifically recommended the extension of the present military system and the provision of at least one paid airport in each city.

SENATOR BURNETT said that the resolution so drafted was an ambiguous one, might induce the federal government held airports for all cities. Various amendments were suggested to make it clear that it was the municipalities that were being urged to set in this respect. The president of the Association said further, however, that he believed that the N.A.A. should concentrate all its efforts in Washington on the five-year program. He briefly recounted the latter struggle to get through each year the appropriations that the programs called for, and the reluctance that the Bureau of the Budget and the Department of Appropriations had displayed in granting the full amount necessary, especially for the army program. He further warned the convention that Congress was becoming nervous about the rising costs for army construction and maintenance, and suggested that the association should be urged to build their own airways and capacity to spot in emergency landing fields scattered over these areas so that a pilot in trouble could always be sure of having a landing field within a few miles. He took as an example the aid granted by the federal government in constructing highways, of which the state carries the major share of the cost. After further discussion the whole matter was tabled, with instruction that resolutions to be prepared by the board of governors should comply with the suggestions made by Senator Burnham.

A few other resolutions were rejected after consideration, because they appeared to the convention of insufficient importance to justify discussion of the Association's efforts or issuance of questionable legal liability of taking the action that had been suggested. One such appeal for the passage of laws or regulations prohibiting the maintenance of any sign likely to mislead pilots as to their whereabouts. This is of course already covered in part by someone in the Air Commerce act prohibiting the maintenance of a false or misleading air navigation utility. Another proposal that was voted down would have called for the revision of any gas tax on fuel used in airplanes.

The resolution committee further brought in, as the last scheduled item of the convention's business, resolutions of appreciation to General Coudert for his long and efficient service as treasurer, to the City of Cleveland for its hospitality, and to the Cleveland chapter, and especially to Floyd J. Logan, for their share in conducting the air meet.

OFFICIAL COMMITTEES REPORTED, and addresses were made from time to time. Gen. W. Gerson of Washington presented the report of the committee on N.A.A. hotels. The committee recommended that the board of governors grant the right to display the Association's insignia, to use hotel in each city which undertakes to act as a room for the use of the N.A.A. membership, providing trip maps, travel reports, etc., to grant space for chapter and local meetings, and to make special arrangements for forwarding recommendations to N.A.A. members at all times. About ten hotels, including the Cleveland in Cleveland, the Ambassador in Los Angeles, the Carlton in Washington, the Foamdale in Omaha, and the Wilshire Park in Pittsburgh have already been approved by the committee. A number of hotels in other cities, including Boston, Baltimore, Atlanta, and Seattle have accepted the requirements but have not yet been formally accepted.

Some discussion was shown over the present practice, observed every year except in 1937, of holding the annual convention in connection with the National Air Races. The membership committee informally suggested that the convention be held in Washington at the time of the National Advisory Commission's spring meeting of the industry at Langley Field. It was also proposed that the meeting be held in the month of November, at a time, and especially of that of the local members, to permit of their giving attention to the convention, the convention might be held in the same city with the annual races but about two weeks earlier.

The N.A.A. program flying club plan was explained to the convention both by J. Brooks Parker, head of the brokerage firm handling the program, and by the writer, chairman of the private flying club committee. The financial aspects of the scheme were explained in particular detail, and the questions that had been most commonly asked and the objections that had been frequently raised in correspondence were answered from the platform. It was reported that only two chapters had so far been actually awarded but that a substantial amount of interest was being shown and that the formation of a number of other clubs was anticipated for the next future. Various firms in the local industry have shown marked interest and the desire to cooperate actively.

Shortly after noon on Saturday, the convention, with no more business to come before it, adjourned sine die.

IMPRESSIONS OF *Olympia*

By JOHN R. CAUTLEY



IT WAS UNFORTUNATE for me American visitor that pressure of his own business prevented the detailed study of the London Show which would have made this report more interesting in the technique of aviation news, therefore, are general impressions which are subject to the error due to lack of time for thorough study.

Olympia might be compared to two Chicago Coliseum alongside each other, and another extension is in process of erection. In general this allows the exhibition of machines in a most adequate way, and the balconies form vantage points for bird's-eye views which are a great help in observing of the machines. Another point is the facilities for obtaining food which are usually lacking at all American shows. But the outstanding thing about the show was its predominantly military character. In a general way the machines exhibited might be divided by the show into, (2) Fighters, (3) Sport, (4) Commercial.

The Military

THE FIRST CLASS needs no explanation, and the machines themselves have by the show been a completely described, so that they may be passed over with a few general comments. The pursuit machines would appear to be about of those built in the U. S. A., and are very definitely designed for a high

speed at 20,000 feet, which speed one is given to understand it is in the neighborhood of 300 m.p.h. This will take some beating.

Most of the planes are conventional, but the Vickers long-range monoplane is a most interesting design. No details are available, but the all-metal structure, rather high spin loading gear and general elements of outline make its performance well worth watching.

The Fairy ships are noticeable for their sleek appearance. In general the larger military land machines do not stand out in a mental picture as a whole, but have many interesting details.

The big naval flying boats do stand out. First, as aircraft designed by people thoroughly oriented with naval ideas, second, as being extremely seaworthy and built to stand knocking about on the water; third, as having a tremendous amount of lifting, rigging, etc., which certainly cannot add to speed, but may be necessary to assure the second item. It will be most interesting to see whether these large boats can be cleaned up in appearance during the next few years and if such cleaning does not aid performance materially.

2. Political

THIS is perhaps a peculiar classification, but a definite one. In this show fall into ships designed by the British, and the French machine. A splendid effort, but useful only as a means of Empire commemoration should value fall. Also the big air liners, such as Handley Page and Armstrong Whitely biplane. They are passenger and mail liners, it is true, but their main purpose is again Empire commemoration in time of peace. Probably out of these will grow the main support for the British aircraft industry, and it is a pity that more firms have not tackled this problem.

Finally, attached to this class, but having leanings toward the true commercial (although the extreme wing of the hull would accommodate a machine greater all of the matter) is the Blackburn "Nile" flying

This is the third article that we have presented upon the Olympia Show. Its predecessors treated the Show in detail. Mr. Cautley's survey is frankly impressionistic. Mr. Cautley, who is well known as an engineer of the Bendix Brake Company, has undertaken to show how the Olympia display would affect an engineer dropped into its midst fresh from American experiences.

boat. The hull shown is shown, but it is beautifully finished and looks both clean and beautiful. If the rest of the structure is as clean as the completed boat should give a very fine account of itself.

A Sport

WE HAVE HEARD all about them. Light planes! Fast! Good for training, probably good for the reduced short distances in Great Britain, but not a business proposition or a solid foundation for a great industry. The automobile had to become basically a business vehicle and a necessary means of transport before it grew great.

4 Commercial

A FEW EXAMPLES of what would be called commercial planes are shown. In other words, four-seaters or larger, 200 hp. or more, closed cabins, single or multiple



Small two-seater with amphibious landing gear

engines, and by no stretch of the imagination military or naval machines.

A V. Roe has frankly taken a lesson from Fokker in Australia. They have a very good-looking three-winged tail-wing Fokker, and what one might call a scale model setting four and mounting three Salmson Gwent engines. Perhaps these four-engine three-engine planes are the coming thing, and if so then as well as the Western three-winged plane, should do very well. The latter has a cruising speed of over 100 mph, which would appear fine for the man who is going somewhere.

The above as well as the other examples, show definitely that developments in the U. S. A. have not gone unobserved. Whether they have been completely observed, and possibly improved upon, or completely and inventively misinterpreted, that detail study and a lot of flying to find out.



Small "biplane" flying boat, with amphibious hull and upper

AVIATION September 17, 1935

Before leaving the place at large, the entirely successful Saunders Flying Boat recommends itself to the eye at least by its clean outline. The engines show the monoplanes using one unconventional form in English or American viewpoint, but this position has the support of both German and British contractors. Here again the top speed of 165 mph is quite consistent with present day practice, but might be increased to advantage.

Random Notes

LEAVING THE BIGGER aspects of the show one is confronted by a large number of interesting things which are possibly best covered by a series of somewhat unrelated incidents.

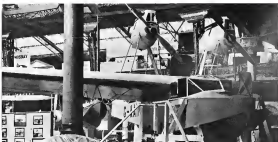
Engines of course, come first.

Unfortunately, for these notes, some of the foremost American exhibitors were at the show, and this observer is really afraid to make comments which would be taken to him by those better informed. [Professor C. E. Taylor installed the engine exhibits at length in *Aviation* (Aug. 25—Ed.)] It would appear in general that out of the Atlantic the radial is not having things all its own way, but this type, with reduction gears, low and high duty superchargers, and various types of cooling, giving the fixed-cooled engines a real run for their money. There were no examples of Elysee Gysal cooling radial, but such studies may be in the secret list. The only radically different engines were two twelve-cylinder designs. Such have been tried before, and these will have to be proved thoroughly, before they attract great interest.

In detail plane design all interest is directed toward metal construction. However, the British designer is in general still consistently opposed to solid fuselages. There is a wide divergence of opinion as to the relative merits of steel and dural. Some use all dural, some look metals and some all steel. It would appear that steel is gaining ground, and it is believed that as surplus designers could have spent the whole period of the show most profitably studying the various methods of construction and especially the variations in design and fabrication which grew out of the use of steel, that the fixtures and machines for forming metal have taken much opportunity and thought in their development.

To an American, the landing gear design of the smaller military machines was surprising. A number of different makes retain the straight axle which has completely died out in the U. S. A. Whether America has

AVIATION September 24, 1935



Shows Saunders-Craft with two passenger engines. Mid with two 180 hp. Warner engines. Left, Vickers all metal housing wing power plant. The construction shows up that is much better than the V. Roe's design.



retained some very more efficient and interesting, both from an historical and an engineering viewpoint. Considerable space would be required for proper comments on the Gyron show, and they are left for these latter squabbles.

The show was thoroughly international in its scope and one was sorry that the American representation was so small. Much of the Continental European industry was represented by engines, and the show was also for the most part dominated by models and photographs.

The winner's imagination was captured by the Dornier Stand, where a line model on their Giant Bear was shown, with numerous photographs of the bear, both at rest and in flight. It is a most ambitious conception and apparently very well carried out.

One point again again is emphasized, and that is that American designers give much to such a show. Not all that they do, is throughly appreciable, but there is much food for thought in much which would hardly be mentioned by any outside reports.

Conclusion

THIS COMMENT as the show has been written in an attempt to indicate the very different problems confronting British designers in particular from those faced by designers in America. There is, certainly, not the domestic market for commercial machines that there is in the U. S. A. Weather conditions are unfavourable, distances are short, the population is less, and the country is not so prosperous. There should be a great market growing out of the post-war type of machine, and a good one for what has been termed the portable commercial type in the communications to and in the civilian portions of the Commonwealth of the Empire.

It is hoped that members of British aircraft industry will be able to take advantage of these potential markets and may the reward which their hard work thoroughly deserves.

over-emphasized the split landing gear for specific purposes is a point for argument.

Certainly, the straight axle can be made light and the wheel motions on landing are smooth, much easier on the wheels and tires. One point is particularly noticeable, and it is to be regretted that more have was not available for their study.

Due to the military character of the show, wheel-less landing gears in single-engine machines were not so prevalent as in the U. S. A. This, of course, was in part due to the use of straight axles.

British are just beginning to make themselves felt in land service of the world. There were approximately twenty machines so fitted, and this observer might be accused of attempting to advertise if he stated the numbers of the various makes.

Amphibians have not apparently taken hold at the designers' imagination to any great extent, and no convincing examples were seen.

The exhibits of the military establishments and the

Ford Motor Company AND AMERICAN

By JOHN T. NEVILL

AERONAUTIC DEVELOPMENT

Ford Air Mail Lines Are Inaugurated; the Company Demonstrates Radio for Planes; Henry Ford Flies with Lindbergh

IF THE YEAR 1937, featured by the Lindbergh flight to Paris, will be remembered as that year in aviation history when the business of flying gained a foothold in America, surely the year 1939 can be said to have given the industry a foothold as the ladder of this nation's commerce.

That must be conceded, if, as has been said, contact air mail is the backbone of American air transport. For, beginning with the Ford-operated Detroit-Chicago and Detroit-Cleveland mail routes, which began service on Feb. 15, 1939, regular schedule private mail began to go into operation in various parts of the country. [The winter recess that operation of the Ford mail lines was preceded by that of several other contract mail routes, such as the Seattle-Victoria route (Oct. 15, 1938), the New Orleans-Plattsmouth route (April 9, 1938), and the Portland-McGeeville, Alaska route (Feb. 1 to June 30, 1938) but they were not regularly operated domestic routes.] The former two routes were placed in operation principally to handle fast mail to and from steamer and their operation was dependent upon the schedules of such vessels. By June 30 of that year there was a total of twelve air mail lines in operation, eleven of these being operated under private contract. The remaining one of these, was the government-operated transcontinental route between the coasts. These routes, including the transcontinental one, covered altogether 6,024 mi., and were in shown in Fig. 1.

During the succeeding six months of that year four additional contract mail routes were placed in operation, notably the New York-Boston and Los Angeles-San Francisco, operated by Colonial Air Transport and Pacific Air Transport, respectively.

By the end of 1939, more than \$5,000,000 had been

invested in the nation's contract airway system by private contractors. The system had a total of 58 routes open; and more than 2,000 air (all included) in that portion of the transcontinental route between New York and Salt Lake) had been lighted for night flying.

These mail routes, six of which carried passengers, and other routes devoted solely to passenger traffic which had begun to spring up, began to cause the market toward which Henry Ford had looked when he entered the aeronautics field. The company has since found a large marketing field in the American and Canadian governments, to private corporations and individuals, but there can be little doubt that its past and present sales in aircraft operating companies have been and are continuing to be demonstrations of worth upon which the other sales are based.

In line with and resulting from the increased usefulness, the year 1938 witnessed a similar increase in the production of both aircraft and engines. When the Kelly air mail act was passed in February, 1938, there were 24 aircraft and engine manufacturers having a total annual output valued at \$12,534,719. By the end of 1938, the number of companies had increased to 39, with a total output for the year 1938 valued at \$20,341,752, an increase of more than 60 per cent over the previous twelve months.

THUS IT WAS that the Ford Motor Company, having developed its plans to a point where it was desirable to do so just as that market began to open. At that time, however, the company was in no position to turn its product out in considerable quantity. Prior to October, 1939, when the new plant was completed and ready for occupancy, production of the tri-continental craft necessarily progressed slowly. Between January 1938 and Jan. 28, 1939, in fact, only four of the 4-AT series had been produced, making an average of one airplane every three months.

With the transfer of operations to the new building, production has increased steadily from the four-a-week schedule effective then, to the four-a-week schedule in operation now. And as this is written, the company announces building plans for enlarging their plant by 135 per cent and making possible the production of one plane a day. The more will be said about that later.

In a previous installment we mentioned the Ford Motor Company's experiments in radio communications work

Early in 1937 these experiments had reached a stage where public demonstrations could be carried out. In this work it should be understood, the Ford company did not stand alone. Since July, 1936, the Bureau of Standards, of the United States Department of Commerce, had been working actively along this same line. Other participating organizations included the General Electric Company and the United States Army Air Service.

The Bureau of Standards had established an experimental field at College Park, Md., in October, 1936, and in December had carried out some highly successful experiments, using a DH plane transferred from the Post Office Department. This work embraced both directional control and radio telephone communications. However, on Feb. 20, 1937, the Ford Motor Company accomplished the first long distance airplane flight on which the plane was guided solely by radio. On that occasion a tri-engine mailplane, specially equipped for the experiment, was flown from Dearborn to McCook Field at Dayton, Ohio, and back, getting its course throughout the journey from radio "beacons" transmitted from the Ford radio station in Dearborn. Another and more interesting experiment along this line was carried out the following May.

On Feb. 15, 1937, the Ford mail line had completed one full year of service, and during the week following Charles C. Kellogg, of Detroit, issued a report covering the operations for the year. The report showed that 90.6 per cent of the scheduled flights over both the



Henry Ford leaving the cockpit of the Ford-Lindbergh mailplane "Right at 24 hours," in which he made his last flight Aug. 24, 1937.

Chicago and Cleveland routes had been completed. Of the remaining 3.4 per cent 2.2 per cent was changed to weather conditions, or lack of mail, and 1.2 per cent to fueling began but not completed due to weather conditions encountered enroute. Between Feb. 15, 1936 and Feb. 1, 1937, the Ford mail planes had flown a total of approximately 84,000 miles and earned 7,749 lb. of mail.

It is worthy of mention Kellogg revealed something of Mr. Ford's willingness to cooperate with the government agencies in the furtherance of aviation. "Too much cannot be said in behalf of the attitude of the Ford Motor Company," the report read. "Quite a long time before this contract service was established, Mr. Ford offered to carry the mails without compensation over their routes in that the Government might acquire sufficient data whereon to base its schedules and its rates and to make the necessary preliminary arrangements. We should not lose sight of the fact that were it not that the Ford Motor Company is furnishing transportation for its own products, the air mail over these routes would have to be carried at a loss."

The Detroit-Buffalo route of the Ford airbuses was inaugurated March 28, 1937, increasing the daily mileage of flying to 1,446 miles. The Buffalo line, however, did not carry mail since the Detroit-Buffalo run had not been officially designated as an air mail route. The following months saw completion of the company's second year of active operation, a two-year period during which the company's planes had flown a total of 570,630 mi., transported 3,022,544 lb. of Ford freight, and 9,885 lb. of United States mail. The company at that time still had one of its early model single-engine planes in daily service. It had been flown nearly 122,000 miles.

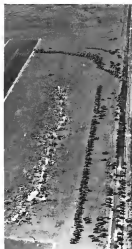
The month of May 1937, was featured by another demonstration of the company's experiments in the field of radio. In aviation the world over, this month is memorable for one of the greatest flights of all time—a flight which did more to popularize aviation than any

Route	Operator	Period	Miles
New York-Boston	P. O. Department	July 1 to July 24, 1937	241
Detroit-Chicago	Ford Motor Company (See Previous Announcement)	Feb. 15 to Feb. 1, 1937	111
Detroit-Cleveland	Ford Motor Company (See Previous Announcement)	Feb. 15 to Feb. 1, 1937	111
Seattle-Victoria	Colonial Air Transport	Oct. 15 to Oct. 15, 1937	241
Los Angeles-San Francisco	Pacific Air Transport	May 15 to May 15, 1939	241
Chicago-McGeeville	Colonial Air Transport	Feb. 1 to Feb. 1, 1938	241
Portland-McGeeville	Colonial Air Transport	Feb. 1 to Feb. 1, 1938	241
San Francisco-Pittsburgh	Colonial Air Transport	May 15 to May 15, 1939	241
Los Angeles-San Francisco	Pacific Air Transport	May 15 to May 15, 1939	241
Chicago-McGeeville	Colonial Air Transport	Feb. 1 to Feb. 1, 1938	241
Portland-McGeeville	Colonial Air Transport	Feb. 1 to Feb. 1, 1938	241
San Francisco-Pittsburgh	Colonial Air Transport	May 15 to May 15, 1939	241
Los Angeles-San Francisco	Pacific Air Transport	May 15 to May 15, 1939	241

Editorial Material of Ford Air Mail Lines

venture before or since. When Charles A. Lindbergh landed his Ryan monoplane on Le Bourget field on the 21st day of May, following his record-to-date flight journey across the sea, attention as a seafarer and as a seafarer immediately assumed a more substantial form as the eyes of the American investor. Just that is a different story, and one far too well known to repeat here.

From May 2-6 the US-American Aircraft Display was held in Washington. During the exhibition, the Bureau of Standards demonstrated its directive radio beacon and radio telephone in a practical way, to sail from airplanes at the Dayton. Following the Washington event, a tri-engined Ford monoplane, equipped with a radio compass, took off from Bolling Field on the return



The Ford Tri-Motor of 1928 crosses Chicago

flight to Detroit. There were eight men in the plane: William H. Mayo; William H. Stout; Harry Broado, the pilot; Harry Russell, the mechanic; two Bureau of Standards engineers; and two newspapermen. German telegraphic communication was maintained with those on the ground in Washington until the plane was approximately 100 miles away from the capital.

Bill Stout gives a most interesting account of the

flight. "We were about 30 miles out from Washington," says Mr. Stout, "and I was talking with someone in the Washington laboratory of the Bureau of Standards. I decided to have a little chat with my old friend Bill MacCadden, so I furnished the Bureau of Standards with his office telephone number and they put him on the line. Through a connection in the Bureau's office I was able to talk with him, and we both got a great kick out of it."

After the plane had departed from Washington it was decided to land in Buffalo, where a prospective plane purchaser was waiting. As it happened, Bill Stout had a terminal dinner appointment in Detroit for 8 o'clock that night and the scheduled Buffalo delay worried him not a little. After some cogitation, and thanks to the plane's special equipment he was a way out. Utilizing the radio telephone, he asked a Bureau of Standards official in Washington to wire Mr. Stout that he would be late into Detroit, and would the plane meet him at the airport with the car.

"After that," Mr. Stout said, "I felt much easier. We landed at Buffalo, picked up a couple of passengers, flew up over Niagara Falls, returned to Buffalo, and then took off for Detroit. A short while before we were due to land I opened up my vest-case and changed into my dinner clothes. My wife had received the wire and met me when our plane landed. I got to the dinner in good time."

Radio was used in connection with the company's planes on two notable occasions after that flight. The first was in June, when the Bureau of Standards equipped a Ford plane, from which the reception occurred Colonel Lindbergh when he returned to America aboard the cruiser "Mercury" was broadcast. The other was during the first annual Ford reliability tour that summer. The company's entry in the tour was equipped with a transmitter and receiver having a range of 300 miles, as well as a radio compass. With the cooperation of 335 miles between Dallas, Tex., and Wichita, Kan. the plane kept in constant touch with Des Moines during the entire tour.

Aside from the Lindbergh flight and its magic effects the spring and summer of 1927 will be remembered for another great progressive step in American aviation. Following seven years of development as an incubator, to its finale, the government was ready to schedule its last bid on the nation's air mail system. On July 1 the Boeing company, successful bidders for the 1,895-mile stretch between Chicago and San Francisco, began operation of that portion of the transcontinental route. The Chicago-New York section, 712 miles in length, was awarded to National Air Transport, Inc., and formally turned over to them for operation on Aug. 15.

Until this time, despite his tremendous investment in money and despite his repeatedly expressed faith in the airplane as a common carrier, Henry Ford himself had never flown. But, on Aug. 18, 1927, Colonel Lindbergh went to Detroit and took Mr. Ford for a ride.

The flight was made in the "Spirit of St. Louis" and the distinguished passenger sat on an improvised seat a wooden box, during his first journey in the air.

Following this, Mr. Ford made a second flight, this time in one of his own planes, with Colonel Lindbergh as his guest.

The eighth and last article of this series by Mr. Nevill will appear in an early issue of AVIATION.

A. S. M. E. Seaplane Meeting AT CLEVELAND

*Rohrbach, Richardson, Sikorsky and Others
Speak on Marine Flying*

By EDWARD P. WARNER



Dr. Adolf Rohrbach

ONE OF THE CLOSING EVENTS of the Race Week was the technical program arranged by the American Society of Mechanical Engineers and held in the Austin Auditorium at the airport on the morning of August 31. Seven papers had been scheduled for the meeting, over which the Hon. David S. Ingalls, Assistant Secretary of the Navy for Aeronautics, presided, but owing to lack of time and the absence of some of the authors only four were actually delivered.

Senor Juan de la Cueva presented a paper on the subject similar to the one which he had delivered before the Society of Automotive Engineers earlier in the week, as described in the September 7 issue of AVIATION. Interest in the subject had in the meantime been intensified by Senor de la Cueva's several demonstrations of his own machine in flight at the airport, displays in the course of which he had put the champions of the airplane dead-stick landing contests to shame by dropping the machine vertically directly on top of the spot used as a target in the accuracy competition.

Of the more formal papers for which manuscripts had been prepared the longest was jointly written by T. P. Wright, chief engineer of the Curtiss Company, and G. A. Lohring, his assistant. It was a general consideration of the uses of airplanes and the conditions governing their design and construction.

Like others who have made a special study of the subject, Mr. Wright and Mr. Lohring laid great stress upon the commercial advantages offered by the ubiquity of seaplane landing fields and by the usual convenience of a ship's waterfront to its business center. Other points of advantage for the seaplane, less often stressed, were also pointed out. Among these were the availability of lighthouses and other aids to navigation, already existing all along our coast lines and important covers for the benefit of water craft and equally serviceable for navigation by air. The primary importance of safety in air transport was taken by the authors as a fundamental trait.

The body of the paper was largely designed to inform readers of broad experience in aeronautical engineering, and contained little that was new in its treatment of the

subject. The subject of immovability on the water was given more attention than it warrants, however, and the authors spoke kindly of the use of a water rudder in aid of securing it. In describing their idea of hull design they suggested that the step should be placed from 33 to 35 ft. aft of the center of gravity of the plane, and that the V of the bottom should be very hollow, or much flared, near the bow so that the plan form of the hull at the stern might be very full in the bow. Until American practice in hull and hull design conforms to this rule, but some of the most successful of German flying boats have had very fine lines forward.

A point in design often overlooked, but which received careful attention from Mr. Wright, is the form of the wing and its effect upon the longitudinal stability, and take-off qualities of a hull. The paper stressed the necessity of crutches with a short ball, and tail surfaces curved on bottom, but the machine should appear backwards when drifting in a head wind.

Mr. Wright and Mr. Lohring suggested that they saw possibilities in the use of hydroplanes, or separate planes, without below the hull of a seaplane. They recognized the practical difficulties, but urged further research upon the scheme.

For the design of a float-supporting structure they recommended that a load instead of 3 lbs. be assumed in loading. The normal distribution of pressure on a float bottom when taking at a high speed has been indicated by tests made by the NACA for the Navy. As the paper pointed out the maximum loads were found just forward of the step and reached 7 1/2 lbs. per sq. in.

Seamanship, construction, practice, attention paid to the advantages of the composite type with wooden frames and a metal skin, especially in small power where it proves, so the authors declared to have a very decided advantage in cost over the completely metal-framed structure.

DR. ADOLF ROHRBACH, former holder of flying boats, stated the problem of design from a point of view somewhat different than that taken by Mr. Wright and his collaborator and went into many technical details.

The front end of a plane is like the hind end of a mule. . . .

BUT the same people who will carefully stay away from a mule's head will unthinkingly rub noses with a plane. They haven't learned yet, that the front end of a plane demands the same respect as the hind end of a mule.

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